



# Anaconda Copper Mine

## Lyon County, NV

U.S. Environmental Protection Agency • Region 9 • San Francisco, CA • October 2016

## Proposed Plan for Operable Unit 8

This Proposed Plan (Plan) describes how the Nevada Division of Environmental Protection (NDEP), U.S. Environmental Protection Agency (EPA) and the Bureau of Land Management (BLM), propose to protect human health and the environment by implementing remedial actions at the former Arimetco portion of the Anaconda Copper Mine known as Operable Unit 8 (OU-8) (Site). The Plan describes the remedial alternatives that the NDEP, EPA and BLM (the Agencies) are considering, and identifies the preferred alternative for implementation. The Plan also explains how the public can participate in this decision, including where to find more information and the date and location of a public hearing. The Agencies request public comment on the Plan and will accept comments at the public hearing and in writing during the public comment period.

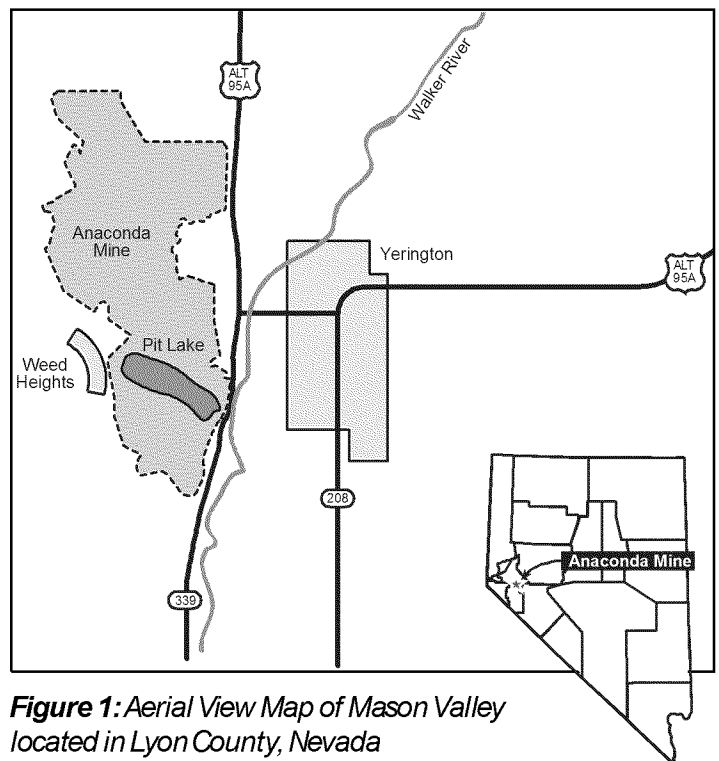
## PROPOSED PLAN AT A GLANCE

### Statement of the Problem

Acidic drain-down fluids from the OU-8 heap leach pads (HLPs) associated with the former Arimetco ore-processing operations are managed in a system known as the Fluid Management System (FMS). The HLP fluids continue to accumulate in the FMS evaporation ponds, and the ponds are expected to reach capacity in three (3) to five (5) years. Additionally, it can be challenging to maintain fluid capacity in the ponds due to unpredictable precipitation, aging transport mechanisms between ponds, varying evaporation rates, and salt build up in the ponds, which limits capacity over time. Repeatedly constructing new evaporation ponds is not a sustainable, fiscally responsible long-term remedy to manage the drain-down fluids.

### Proposed Solution

The agencies propose to **reduce the risks** of future release of OU-8 HLP drain-down fluids by: (1) continuing to actively manage and evaporate the fluids, rehabilitating the HLP perimeter ditches, and continuing operations and maintenance (O & M) activities; (2) closing all ponds not needed to manage residual drain-down fluids; (3) regrading/reshaping and capping with an evapotranspiration (ET) soil cover on all surfaces of the HLPs, including side slopes, to further minimize infiltration; and (4) installing stormwater storage and routing features including piping, open channels, and stormwater basins. The basins will be designed and



**Figure 1:** Aerial View Map of Mason Valley located in Lyon County, Nevada

constructed with the long-term objective of connecting to and complementing **site-wide stormwater management** features in other operable units as they get constructed. This remedy is recommended because it will achieve substantial drain-down fluids reduction by addressing the source of the fluid generation through capping the HLPs and significantly reducing volumes and flowrates of fluids to manage.

## Your Comments

You can provide your comments on this Proposed Plan either verbally during a future meeting (date to be announced) or in writing via letter, fax, or email (see page XX for contact information). The Agencies invite comment on all alternatives and rationale presented in this Plan. The Agencies will consider your comments as we develop our final decision on how to remediate OU-8, and we will respond to all comments in a final written document.

## Public Comment Period

The public comment period runs for 30 days from  
Xday, November X, 2016 to  
Xday, December X, 2016

## Public Meeting

A public meeting will be held on  
Xday, November X at X:00 pm at X

The purpose of this meeting is to give the community the opportunity to ask questions and provide official comments regarding the proposed remediation plan. In addition to the public meeting, the public is invited to send their comments via letters, faxes, and emails to the NDEP.



## Cleanup Framework

The Plan is a document that the lead agency is required to issue to fulfill the requirements of Comprehensive Response Compensation and Liability Act (CERCLA, also known as "Superfund" law) Section 117(a) and the National Contingency Plan Section 300.430(f)(2). This Plan highlights key information from the Remedial Investigation and Feasibility Study Reports. Interested readers can obtain copies of these and all other documents in the Administrative Record file (documents relied upon for making this remedy decision).

## Contents

Insert Proposed Plan Outline inset text box:

# SITE BACKGROUND AND CHARACTERISTICS

## Mine History

Copper in the Yerington District was initially discovered in the 1860s, with large-scale exploration of the copper system occurring in the early 1900s when the area was organized into a mining district by Empire-Nevada Copper Mining and Smelting Co. Large scale mining operations began at the Site around 1918 as the Nevada Empire Mine. Anaconda Copper Mining Company acquired the Anaconda Mine property (Property) in 1941 and conducted active mining operations from 1953 through 1977. During Anaconda's twenty-five (25) year operational period, approximately 1.7 billion pounds of copper were produced, resulting in the generation of waste rock, tailings impoundments, and evaporation ponds. Atlantic Richfield Company (ARC) acquired the Property from the Anaconda Copper Mining Company in June 1978 and terminated mining operations at the Site. In 1982 ARC sold its interests in the Property to a local resident who leased the Site to a small mining operation. In 1989 all of the former Property was sold, with the exception of the Weed Heights community to Arimetco. Arimetco operated their HLP copper recovery operation using existing ore at the Site and ore from the MacArthur Pit from 1989 to 1999, at which time it ceased all mining operations. The area of former Arimetco operations comprises approximately 250 acres within the entire 3,400-acre Property. During Arimetco's operation of the Site, four phases of HLP construction were completed using ore from on-site and off-site sources. High density polyethylene (HDPE) liners were installed under each HLP to collect leachate that was transferred to collection ponds comprising twelve (12) acres and then conveyed at flow rates exceeding 5,000 gallons per minute (gpm) to the solvent extraction and electrowinning (SX-EW) plant for processing.

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## Investigation and Interim Response Actions

Several site investigations, regulatory actions and interim abatement and fluid management activities have occurred at the Site since the mid-1980s. In December of 1998, NDEP issued a notice of non-compliance to Arimetco because they lacked a valid reclamation permit and had not posted an adequate bond to ensure reclamation responsibilities would be completed. NDEP also required Arimetco to cease mining and adding new ore, acid, and make-up water to the HLPs. After Arimetco abandoned the Site in November 1999, NDEP began managing the HLP drain-down fluids to prevent overflow of fluids from the ponds. At that time there was an estimated 90 million gallons of solution present in the HLPs and FMS. The solution drain-down rate decreased from 3,300 gpm during active operation to less than 35 gpm in 2002. Currently less than 10 gpm (annual average) is leaving the HLPs and collecting in the ponds. ARC continues to perform O & M activities for the OU-8 FMS, and has paid for other investigation and response activities as a result of a series of Orders (1985, 10/20/02, 3/31/05, 1/12/07 and 5/1/09).

In 2004, NDEP requested that EPA take regulatory lead of the entire Site, including OU-8, with NDEP as support agency. Since then several interim response actions have been performed, with ARC and EPA assuming the costs of those actions. Response actions have included repairing and replacing liners, and in 2006, construction of a new evaporation pond to increase the FMS capacity. Over the years evaporation increased the amount of solid precipitates in the system ponds, reducing FMS capacity. Currently ARC continues to perform O & M for OU-8, as provided for in the 2009 Consent Order. Also in 2009, a mining company, Singatse Peak Services (SPS) agreed to purchase mineral rights and surface land in OU-8, with the intent of re-processing the recoverable copper in the solids and liquids as part of an overall site-wide mining plan. From 2010 to 2012 EPA conducted a Feasibility Study (FS) evaluating remedial alternatives. In 2013, in response to diminishing fluid capacity, NDEP contracted a local engineering firm to construct two additional evaporation ponds. In 2015, NDEP contracted a local engineering firm to produce a more detailed Focused Feasibility Study Conceptual Closure Plan (FFS). The FFS is a preliminary engineering design and cost estimate for closing the HLP system. In 2016, SPS agreed to implement an enhanced evaporation pilot study on the vat leach tailings (VLT) HLP. This technology is not intended to act as a final remedy, but may potentially reduce the fluid in the FMS, providing additional time to secure Superfund or other funding sources for design and construction of the approved remedy.

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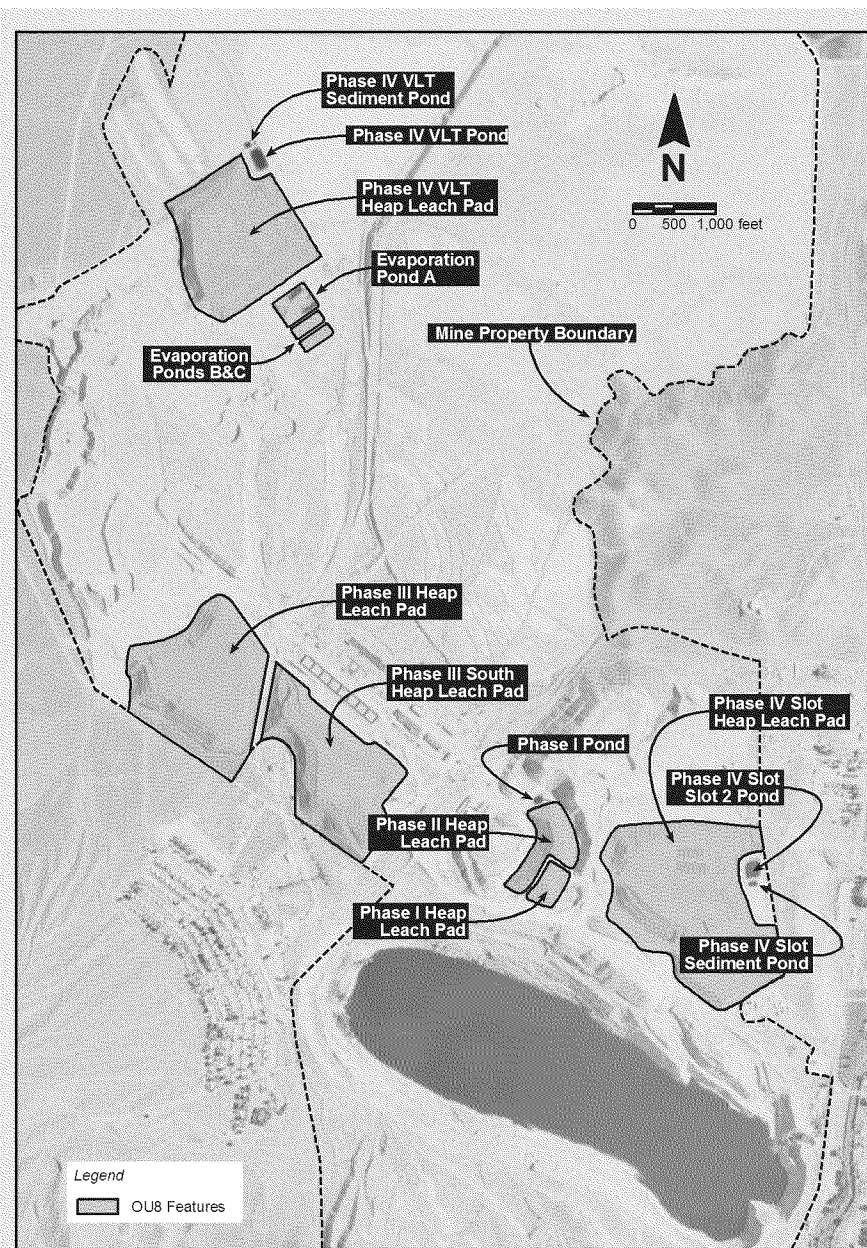
## Drain-down Fluid Characteristics

There are currently five ponds collecting drain-down fluids from the HLPs with a total design capacity of approximately 14.54 million gallons. Pond capacity becomes an issue due to the high total dissolved solids in the copper sulfate solution, which precipitate out causing reduced fluid capacity in the ponds. The drain-down fluids that exit the HLPs were assessed in 2009-2010, with analytical results indicating that metals, including aluminum, antimony, arsenic, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, zinc, and radionuclides exceeded either the primary or secondary drinking water standards. It is important to note that this water is not being used by anyone as a drinking water source. The flow-rate and quality of the drain-down fluids were found to fluctuate seasonally, with the highest metal concentrations occurring during the warm summer months, when fluids have evaporated and dissolved solids concentrations have increased.

## SCOPE AND ROLE OF OPERABLE UNIT

EPA, NDEP, BLM and ARC individually and collectively discussed the overall Anaconda Mine Site priorities, and have prioritized the OUs at the Site. We determined the highest priority OUs are OU-8, Arimetco, OU-1 site-wide groundwater, OU-3 Anaconda Process Areas, OU-4a, Evaporation Ponds, and OU-7, Wabuska Drain.

The agencies decided to act more quickly on these higher priority OUs due to the potential human health and environmental risks posed by these OUs. The remaining OUs: OU-2, Pit Lake, OU-4b, Sulfide Tailings, OU-5, Waste Rock Dumps, and OU-6, Oxide Tailings pose less risk to human health and the environment; work on these OUs will proceed once the priority OUs have finalized Remedial Investigation/Feasibility Studies (RI/FSs), Human Health Risk Assessments (HHRAs), Proposed Plans, Records of Decision (RODs), and remedial actions have begun.



*OU-8 consists of the surface features (heap leach pads, fluid management ponds and conveyance channels, and process areas) and underlying soils on approximately 250 acres of former Arimetco Operations. OU-8 does not extend to the groundwater; that portion of the Anaconda Site is part of OU-1.*

## SUMMARY OF SITE RISKS

Solid materials and drain-down fluids in OU-8 contain chemicals of concern that pose a potential risk to individuals and wildlife that come into contact with them. Although these chemicals are naturally occurring, residual materials from past ore extraction and processing activities contain these chemicals at higher concentrations than in native rock and soil. EPA evaluated the risk to humans from these chemicals in a study called a human health risk

assessment. For potential effects to area biota, EPA completed a screening-level ecological risk assessment (SLERA). A summary of the risk assessment process and the results of the risk assessment for OU-8 are presented in this section of the Proposed Plan.

Human health risk assessments estimate the health risks to people from exposure to contamination either now or in the future. For EPA studies, "risk" is the probability of harm to people from exposure to chemicals. Two types of health risks for people are evaluated: the risks that can cause cancer and the risks that can cause other health effects. The results of the risk assessment are used to determine if the contamination at a site poses an unacceptable risk to human health or the environment under CERCLA. For cancer risk, EPA calculates an increased likelihood of developing cancer from exposure to a site contaminant over a person's lifetime. For non-cancer health effects, EPA calculates a hazard quotient (HQ) or hazard index (HI) for both humans and wildlife. The non-cancer hazard index has a threshold below which EPA does not expect any non-cancer health effects. If the HQ or HI is 1 or higher, it is possible that exposure to site contaminants could be a risk to human health or to wildlife.

### Human Health Risks

The risk assessment indicates that arsenic, chromium, radium-228, and uranium-238 are the primary contributors to human health risk from OU-8, based on their concentration, toxicity, locations throughout OU-8, and potential for humans to come into contact with them. At some locations, the chemicals cobalt and copper are also primary contributors to the potential risk from OU-8.

The risk assessment includes evaluation of potential exposure based on current and reasonably anticipated uses of land on and adjacent to OU-8. Access to OU-8 is currently restricted by fencing around the former Arimetco Property, thus limiting the potential for direct contact with these materials. However, future land uses may



change and increase exposure. The current landowners of OU-8, Singatse Peak Services, and the BLM (as United States land manager) indicate mining is a potential future use of these properties. The timing of this potential future use is dependent on uncertain economic factors, including the price of copper on the world market. If SPS determines that mining is not viable and vacates the Property, other reuse options become more likely. Variable OU-8 topography is likely to limit building development on several areas, but there are level areas where future development may bring people into contact with chemicals of concern. Mixed private and federal ownership of the land, along with the presence of contamination also limits re-development potential due to federal restrictions associated with transfer of contaminated land. Input from the community gained as part of Site Reuse Assessment for the Mine Property completed by EPA in April 2010 indicates a range of potential reuses, with mining considered to be most likely. Current and future adjacent land uses include residential, agricultural, and light industrial and commercial uses.

Based on these current and reasonably anticipated future land uses, risk presented by OU-8 chemicals of concern was evaluated for the following populations on-site: industrial construction workers, trespassers, and future residential children and adults. Risk to off-site residents (outside of the Property) was also evaluated.

Agricultural products grown in the area have been tested and there is no evidence that OU-8 or the Anaconda Copper Mine Site has had any impact on agricultural production. Most agriculture fields in the area are located away from the Anaconda Site, either hydrologically up-gradient or not hydrologically connected to the Site at all.

The results of the risk assessment indicate that the maximum carcinogenic risk was 8 in 100,000 to an outdoor worker exposed to OU-8 materials at the one of heap leach pads (VLT Phase IV at the northern end of the Mine Property), primarily through ingestion of soil materials containing arsenic, chromium, radium-228, and uranium-238. Current and future non-cancer risks for all populations except the construction worker were all less than a HI of 1. For construction workers, Hazard Indices of between 1 and 3 were indicated due to ingestion of soil containing arsenic, cobalt, and copper.

## Ecological Risks

The SLERA identified chemicals of concern in OU-8 surface materials and drain-down solutions present at concentrations that may cause adverse effects to terrestrial wildlife (birds, mammals, insects, reptiles, and plants). Aquatic habitat supportive of aquatic species is not present, but the risks of exposure to drain-down fluids by terrestrial wildlife was evaluated. The primary chemicals of concern for wildlife included copper, lead, mercury, molybdenum, selenium, thallium, and zinc from surface materials and copper and uranium from drain-down solutions. However, the assessment found that these potential chronic risks are likely overestimated due to lack of habitat and food resources within OU-8.

The SLERA also noted that concentrations of aluminum, copper and low pH in the evaporation pond fluids are at levels acutely lethal to birds and mammals. Current bird deterrence measures help to limit the potential for bird exposure to pond fluids, but are not considered a permanent solution.

## Risks to Groundwater

Part of the risk posed by OU-8 is the potential for additional groundwater contamination if drain-down fluids are not continuously controlled. Because the heaps are not covered, precipitation on the heaps continues to generate acidic fluids that require ongoing management in the fluid management system. Failure to reduce the generation or continuously manage these fluids is likely to result in releases to soil and groundwater from the system. Additional contamination of groundwater will increase risk associated with beneficial uses of that groundwater, including its currently designated use as a domestic water supply. Although past releases and potential future releases from OU-8 and other Operable Units at the Site also have the potential to contaminate groundwater, the actual risk evaluation of exposure to contaminated groundwater both on the Mine Property and other areas will be completed separately as part of Operable Unit 1 – Site-wide Groundwater for the Site.

It is the collaborative best professional judgment of the agencies that active measures are necessary to protect public health and the environment from actual or threatened releases of hazardous substances into the environment.

## REMEDIATION ACTION OBJECTIVES

Remedial Action Objectives (RAOs) focus on isolating the contaminant source, preventing contact with contaminant sources, and limiting further migration of metals contamination from source areas into surrounding soil, surface water and groundwater.

### The RAOs are:

1. Prevent ingestion/direct contact with heap leach materials and fluids containing contaminants of concern (COCs) above human health risk-based levels;
2. Minimize exposure to heap leach materials and fluids containing contaminants of ecological concern (COECs) at levels that are harmful to ecological receptors;

These first two objectives are source control objectives, which are established to protect humans and ecological receptors from mine residual materials. This objective will be met by successful covering and erosion control of these materials.

3. Maximize groundwater protection by preventing migration of COCs to groundwater at levels above maximum contaminant levels (MCL).

This objective is an additional source control objective to prevent further degradation of groundwater. This objective will also be met by successful covering and erosion control of mine residual materials and ongoing fluid collection and management.

## DESCRIPTION OF REMEDIAL ALTERNATIVES

The Agencies selected four remedial alternatives for evaluation and have reached agreement on the selection of a Preferred Alternative. Each of the Alternatives are described separately below.

|  |   |  |
|--|---|--|
| <b>Alternative 1</b>                         | FS Alternative 2  | No Further Action Alternative                    |
| <b>Alternative 2</b>                         | FS Alternative 6a   | Passive Evaporation and Top Capping of HLPs      |
| <b>Alternative 3</b>                         | FS Alternative 8a   | Passive Evaporation and Complete Capping of HLPs |
| <b>Alternative 4 (Preferred Alternative)</b> | Combination of FS Alternatives 6a and 8a, plus stormwater management. |  |

Each of these alternatives are categorized as somewhat to mostly compliant with the RAOs, implementable, and effective, and they range from relatively low to very high cost of implementation and O & M.

Other alternatives in the FS were rejected for final consideration as non-compliant, less cost-effective, or impractical to implement.

The 2015 FFS focused on a combination of Alternatives 6a and 8a, and after careful evaluation of RAOs, cost estimate analyses, and discussions between NDEP and EPA, it was determined that some combination of Alternatives 6a and 8a (PP Alternatives 2 and 3), with the addition of stormwater management, accomplished the goals and objectives, while maintaining a reasonable cost. A brief discussion of each of the first three alternatives is presented below, and a more detailed discussion of the preferred alternative follows.

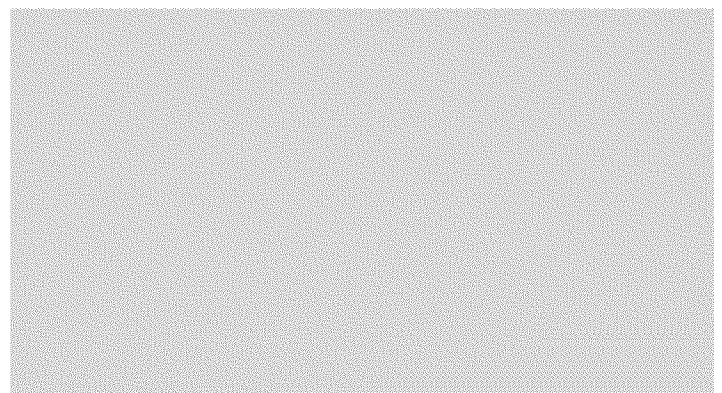


Figure on Alternatives...

### Alternative 1 (FS Alternative 2) *No Further Action Alternative*

Alternative 1 provides a baseline for comparing other alternatives. It is a required alternative in the evaluation process. It includes continuation of FMS O & M (active fluids management, passive evaporation of pond fluids, HLP perimeter ditch rehabilitation and O & M, site access controls, and wildlife deterrent measures for all ponds) activities during and after all remedial actions are completed. Institutional controls that restrict human and wildlife contact with materials are inherent in the ongoing O & M activities.

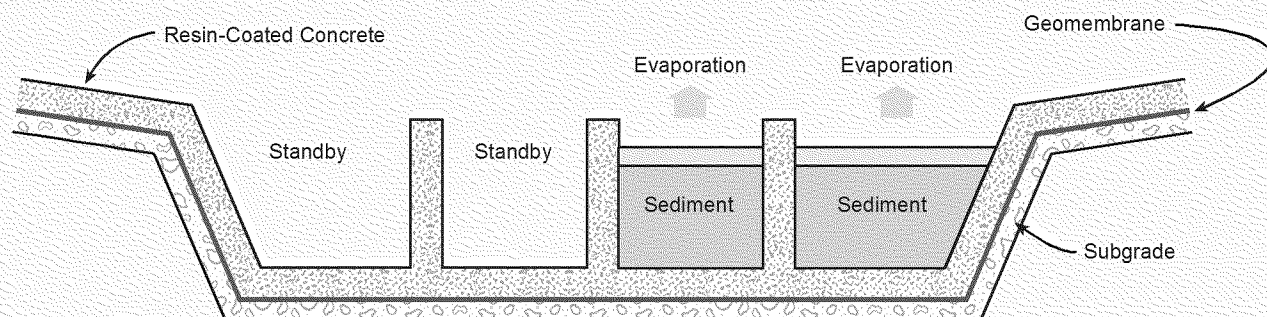
The 30-year Net Present Value (NPV)\* cost of Alternative 1 is approximately \$2.1 million. The estimated costs are mostly associated with long-term O & M requirements, with \$1,740 allocated for capital expenses and \$168,500 allocated for annual O & M costs.

NPV: Net Present Value (NPV) is the cost in today's dollars of a project's total costs, including post-construction operations and maintenance activities, taking into account the time value of money.

### Alternative 2 (FS Alternative 6a) *Passive Evaporation and Top Capping of all HLPs*

Alternative 2 includes all the components included in Alternative 1, plus implementation of access restrictions and engineering controls, replacement of pond liners after 10 years, construction and closure of solids repository for residuals from liner replacement, leak detection monitoring, Monitored Natural Attenuation (MNA) and sprays/sealants for dust control, construction of 2-acre concrete basin for solids dewatering and management, closure of all existing ponds except the EPA 4-Acre Pond, construct a berm across the 4-Acre Pond to divide it into two cells, replacement of 4-Acre Pond liner after 5 years, disposal of pond solids in new on-site repository, HLP top deck grading and soil cover applied to top deck only, to minimize infiltration, and sealants and sprays applied on sideslopes on all HLPs for dust control.

The 30-year NPV cost of Alternative 2 is approximately \$29.7 million. The estimated costs are broken down into \$21,128,500 for capital expenses and \$686,300 allocated for annual O & M expenses.



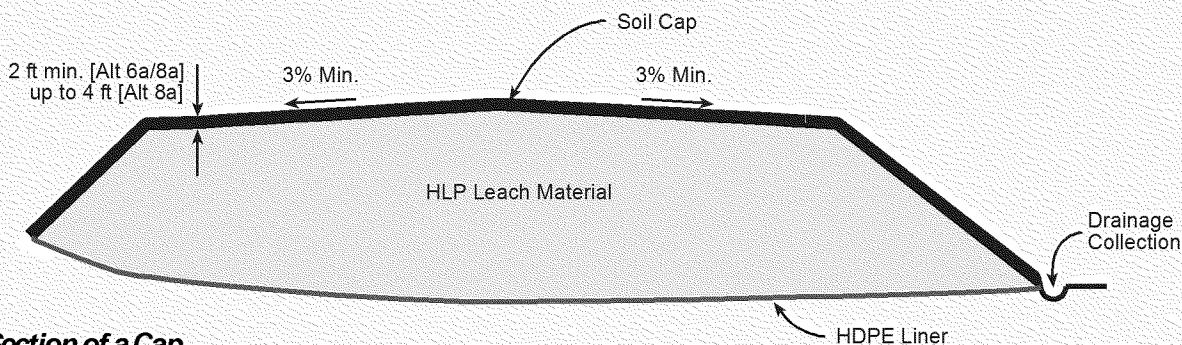
**Concrete Evaporation Basin**

### Alternative 3 (FS Alternative 8a)

#### Passive Evaporation and Complete Capping of HLPs

Alternative 3 includes all the components of Alternative 2 except spray sealants and construction of a 2-acre concrete basin, plus regrading/reshaping and capping with a 4-foot thick ET soil cover all surfaces of the HLPs, including sideslopes, to further minimize infiltration. Alternative 3 also includes reprocessing and disposal or closure in place of the 4-Acre Pond.

The 30-year NPV cost of Alternative 3 is approximately \$58.2 million. The estimated costs are broken down into \$51,738,000 for capital expenses and \$519,200 allocated for annual O & M expenses.



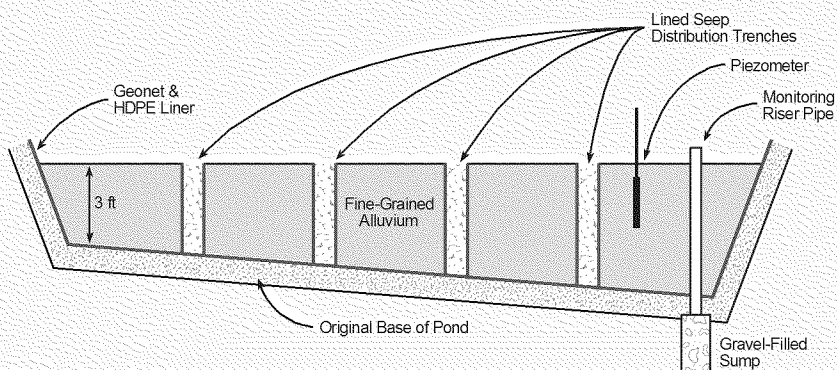
**Cross-Section of a Cap**

### Alternative 4 (Preferred Alternative)

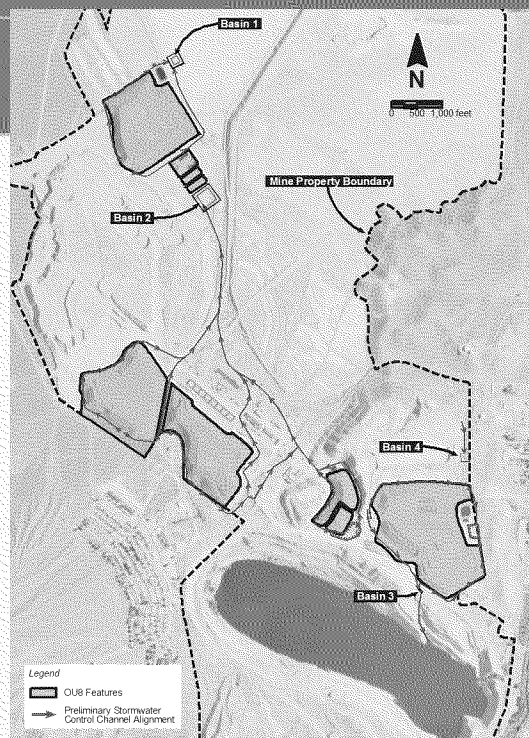
#### Combination of FS Alternatives 6a and 8a, plus stormwater management actions

Alternative 4 includes all the components of Alternative 3 except the ET soil cover over the HLPs would only be two (2) feet thick, plus stormwater management actions are included. The stormwater management would store and route stormwater using piping, open channels, and stormwater basins. The system would be designed and constructed with the long-term objective of connecting to and complementing site-wide stormwater management features as they are constructed in the future.

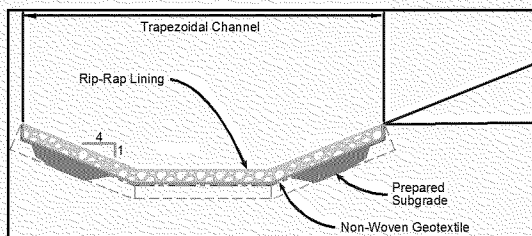
The 30-year NPV cost of Alternative 4 is approximately \$36.1 million. The estimated costs are broken down into \$30.4 million for capital expenses and \$381,700 allocated for annual O & M expenses.



**E-Cell**



**Stormwater Drainage Plan**



**Stormwater Drainage Channel**



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# EVALUATION OF ALTERNATIVES

## Discussion of Nine Criteria: Threshold Criteria, Primary Balancing Criteria and Modifying Criteria

### Threshold Criteria include:

#### 1. Protection of human health and the environment

This criterion addresses how the alternative achieves and maintains protection of human health and the environment. It focuses on whether a specific alternative achieves adequate protection from site risks.

#### 2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

This criterion addresses how the alternative performs relative to mine closure and water protection requirements.

### Primary Balancing Criteria include:

#### 1. Long-term effectiveness and permanence

This criterion addresses the long-term effectiveness of alternatives in maintaining protection of human health and the environment and their relative permanence. It is an assessment of how the system will perform years into the future.

#### 2. Reduction in toxicity, mobility and volume

This criterion addresses the ability of the alternative to permanently or significantly reduce toxicity, mobility or volume of contaminants. It addresses the type of quantity of treatment residuals remaining at the site, and the degree to which treatment reduces the inherent hazards posed by principal threats at the site.

#### 3. Short-term effectiveness

This criterion addresses the impacts of the alternative during construction and implementation until the project's initial objectives and goals are met. The criterion is also used as a measure of how quickly an alternative can meet remedial action objectives.

#### 4. Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of services and materials, including technical difficulties and unknowns associated with the construction and operation of a technology and the ability to monitor the effectiveness of the remedy.

#### 5. Cost

This criterion addresses the capital and operations and maintenance costs of each alternative.

### Modifying Criteria include:

1. State acceptance; and,
2. Community acceptance.

## Evaluation of Alternatives 1, 2 and 3

Each of the Closure Alternatives evaluated in the FS, and further focused in the FFS, are outlined above and discussed below. For more detailed analyses of all the remedy alternatives, those retained and those rejected by the Agencies, the reader is directed to the 2016 Final FS, which can be found at the Site's Information Repositories listed at the end of this Plan. Each of the Agency-retained Alternatives was scored for its effectiveness in addressing seven of the nine criteria. The community acceptance criterion will be considered during the public comment period for the Proposed Plan. The state acceptance criterion is inherently met as this Proposed Plan is developed and approved by the State, together with EPA and BLM.

### Alternative 1 Evaluation

#### Some site RAOs would be achieved with Alternative

1. Human health and ecological risks to exposure of contaminated drain-down fluids and HLP materials would be reduced, but not eliminated, and the risk of leaks and possible groundwater contamination would be reduced, but not eliminated. Alternative 1 would not comply with all ARARs, particularly with State of Nevada groundwater protectiveness. Long-term effectiveness and permanence would not be achieved. The volume of contaminated fluids would be reduced, but the mass of contaminants would remain the same, and no treatment or disposal of contaminated solids is included in this Alternative. Short-term effectiveness remains the same as no additional risk is incurred. Alternative 1 is implementable and is currently being implemented. No additional time for construction and implementation of remedy is associated with Alternative 1. In reality, as solid precipitates accumulate and reduce fluid capacity additional ponds would need to be constructed in perpetuity; the costs for that long-term activity is not included in this Alternative.

Overall grade for Alternative 1 is deemed a D –“**Less Favorable**”.

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## Alternative 2 Evaluation

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Human health and ecological risks to exposure would be further decreased, but not entirely eliminated. More ARARs would be complied with, particularly by upgrading FMS to meet Nevada Administrative Code requirements. Due to the top cap greatly reducing infiltration of fluids through the HLPs, drain-down fluid rates will be greatly reduced. However, contaminant mass and volume would not be substantially reduced. Short-term risks to exposure from dust inhalation would be increased. Alternative 2 is deemed more difficult to implement than Alternative 1. Estimated time for construction and implementation of Alternative 2 remedy is 2 years.

Overall grade for Alternative 2 is deemed a **B- to C+ -“More Favorable”**.

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## Alternative 3 Evaluation

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Degree of protectiveness is considerably higher with Alternative 3 actions, primarily due to complete cover of HLPs, including sideslopes. Most ARARs would be complied with, and closure requirements would be fulfilled. Long-term effectiveness would be increased and further reduction in infiltration and drain-down fluid rates would be achieved, although contaminant mass and volume may not change. Moderate to high short-term risks would be increased due to additional dirt moving work. Alternative 3 is even more difficult to implement than the other Alternatives. Estimated time for construction and implementation of Alternative 3 remedy is 2 years.

Overall grade for Alternative 3 is deemed a **B+ -“Favorable”**.

to NDEP Bureau of Mining Regulation and Reclamation closure requirements and guidance, which are required at active, permitted mines in Nevada. These closure requirements are also deemed important standards for closure of Abandoned Mine Land sites. Alternative 4 is deemed more implementable than Alternatives 2 and 3 with the routing of non-contact stormwater flow around the HLPs and FMS. Additional cost savings are realized as well due to reduction in O&M tasks related to the closure of all ponds not needed to manage residual drain-down fluids. Phasing of Alternative 4 remedy construction and implementation is timed for 2-3 years. At completion of full closure, the agencies concur that all RAOs would be met. Based on information available, the agencies believe the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The agencies expect the Preferred Alternative to satisfy the following statutory requirements of CERCLA §121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost-effective; 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfy the preference for treatment as a principal element.

Overall grade for Alternative 4 is deemed an **A -“Most Favorable”**.

**The Preferred Alternative can change in response to public comment or new information.** Additionally, some aspects of closure elements, including, but not limited to, cover design and cover material selection will be specified during the remedial design phase. The details of those design-related elements are not specified in this Proposed Plan.

# EVALUATION OF PREFERRED ALTERNATIVE

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## Alternative 4 Evaluation

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This Alternative is recommended because it will achieve substantial risk reduction by both treating the source materials constituting principal threats at the Site, and providing safe management of remaining material. This combination reduces risk sooner than the other alternatives and costs less than Alternative 3, and not much more than Alternative 2. The Agencies agree that a maximum degree of protectiveness occurs with Alternative 4 actions, although, as in Alternatives 2 and 3, short-term exposure risks are increased. This alternative also more closely adheres

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## LIST OF ACRONYMS AND ABBREVIATIONS

|               |  |                |   |
|---------------|--|----------------|---|
| <b>ARAR</b>   | Applicable or Relevant and Appropriate Requirements                  | <b>HHRA</b>    | human health risk assessment                |
| <b>ARC</b>    | Atlantic Richfield Company   | <b>HLP</b>     | heap leach pad                              |
| <b>BLM</b>    | Bureau of Land Management  | <b>MCL</b>     | maximum contaminant level                   |
| <b>CERCLA</b> | Comprehensive Environmental Response, Compensation and Liability Act | <b>NDEP</b>    | Nevada Division of Environmental Protection |
| <b>EPA</b>    | U.S. Environmental Protection Agency                                 | <b>NPV</b>     | net present value                           |
| <b>ET</b>     | evapotranspiration   | <b>O&amp;M</b> | operations and maintenance                  |
| <b>FMS</b>    | Fluid Management System  | <b>OU</b>      | Operable Unit                               |
| <b>FS</b>     | Feasibility Study  | <b>RAO</b>     | Remedial Action Objective                   |
| <b>FFS</b>    | Focused Feasibility Study Conceptual Closure Plan                    | <b>RI/FS</b>   | Remedial Investigation/Feasibility Study    |
| <b>gpm</b>    | gallons per minute   | <b>SPS</b>     | Singatse Peak Services                      |
| <b>HDPE</b>   | high density polyethylene  | <b>VLT</b>     | vat-leach tailings                          |

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## GLOSSARY OF TERMS

**Applicable or Relevant and Appropriate Requirements (ARARs)** – Any state or federal statute or regulation that pertain to the protection of human health and the environment in addressing specific conditions (chemical, action, and location) or use of a particular cleanup technology at a Superfund site.

**Contaminant of Concern** - These are chemicals that significantly contribute to unacceptable risks to human health.

**Contaminant of Ecological Concern** – These are chemicals that significantly contribute to unacceptable risks to ecological receptors.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** – The Federal law that addresses problems resulting from releases of hazardous substances to the environment.

**Drain-down Fluid** – The solution that is collected at the bottom of the heap leach pad that typically contains salts and metals.

**Evaporation ponds** – These are artificial ponds with large surface areas designed to efficiently evaporate water by convection. These ponds are also used to separated ores or sediment from water.

**Feasibility Study (FS)** – A process under CERCLA to develop, screen, and evaluate various remedial alternatives being considered for selection of a remedial action.

**Fluid Management System (FMS)** – A network of ponds and ditches used to separately convey and treat drain-down fluids, and collect and discharge stormwater.

**Heap leach pad (HLP)** – Heap leaching is a mined ore extraction process for recovering metals. In the process crushed ore is placed on a liner which constitutes a HLP and a liquid is passed through the crushed ore, creating a drain-down fluid that is concentrated in dissolved metals for recovery. At the end of mining operation, a HLP may be left in place with steps taken to prevent continued leaching of metals.

**Human Health Risk Assessment (HHRA)** – A study that provides an evaluation of the potential threat to human health in the absence of any remedial action.

**Remedial Investigation (RI)** – A process under CERCLA to determine the nature and extent of the problem presented by a contaminant release.

**Screening-Level Ecological Risk Assessment** – A study that estimates the possible effects of contamination on plants and animals in the absence of any remedial action.



# Anaconda Copper Mine

## Public Participation and Solicitation of Comments

The agencies will accept public comments for thirty (30) days following the release of the Draft Proposed Plan. Persons providing comments should be aware that this public comment period is an opportunity to comment not only on this proposed action, but also on the alternatives that were considered by the agencies. Comments will be accepted by mail, email or fax. Comments will also be accepted during a Public Hearing on XXX. Please reference the "Anaconda Copper Mine Proposed Plan" in your submitted comment. Comments should be submitted to the following contact:

**Jeryl R. Gardner, P.E., C.E.M.**  
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Carson City, NV 89701  
[jgardner@ndep.nv.gov](mailto:jgardner@ndep.nv.gov)  
Fax: (775) 687-8335



## Information Repositories Locations

Nevada Division of Environmental Protection  
901 S. Stewart St.  
Carson City, NV 89701

**Bureau of Land Management**  
1340 Financial Blvd  
Reno, Nevada 89502

**Yerington Public Library**  
20 Nevin Way  
Yerington, NV 89447

**US Environmental Protection Agency**  
Region 9 Superfund Division (SFD-1)  
75 Hawthorne St.  
San Francisco, CA 94105

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United States Environmental Protection Agency, Region 9  
75 Hawthorne Street (SFD-6-3)  
San Francisco, CA 94105  
Attn: Sarah Cafasso (Anaconda 10/16)

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